The time for spraying is over in fight against Zika, professor says

September 20 2016, by Matthew Degennaro

Aedes aegypti can spread the Zika virus. Credit: Florida International University

Biologist Matthew DeGennaro conducts research on mosquito behavior with FIU's Biomolecular Sciences Institute. He hopes to uncover information that will someday lead to better repellants. He holds the

distinction of being the first scientist to ever create a genetically modified mosquito. Though his mutant mosquitoes are lifelong residents of his lab, he believes genetically modified mosquitoes also have a place in reducing mosquito populations in South Florida. As the number of confirmed Zika virus cases is on the rise in Miami Beach, he says the time has come to stop spraying.

We are no longer insulated from the mosquito-borne illnesses that have plagued our neighbors in Latin America and the Caribbean. With Zika here, our tropical playground is becoming less safe for women to have children. Although kids are not part of my life plan, I am no less concerned.

I have dedicated my life to studying the Aedes aegypti mosquito that is the principle carrier of Zika, Chikungunya, and Dengue. Aedes aegypti mosquitoes have evolved to thrive in cosmopolitan environments. They are attracted to human odor, and they prefer our blood. When an infected female bites, her saliva carries viruses into our blood stream. Females use our blood to nourish her offspring that can mature in just a tablespoon of water. Male mosquitoes live on nectar and don't bite. Through new genetic approaches, my lab and others in the field of mosquito biology have begun to uncover how mosquitoes find people. We are laying the groundwork to make the next generation of mosquito repellents. But while we work to develop new tools, Zika's arrival is a call for action.

We face a choice on Miami Beach. Do we continue the traditional approaches to reducing mosquito populations or do we turn to new methods? Spraying insecticides and removing standing water have had limited success, and they have failed to stop the spread of Zika in other countries. Insecticide spraying kills only 50 to 70 percent of the adult mosquitoes in an area, while a kill rate of 90 percent is necessary to halt Zika's spread. The insecticides used also kill beneficial insects like

butterflies and honey bees. Alarmingly, the insecticide Naled, recently used in Wynwood, is banned in Europe. Unfortunately, eliminating mosquito breeding sites is painstaking work, since every drop of standing water must be treated with larvicide or removed. Given these limitations, we need a better approach.

Luckily, a new technology has been developed over the past decade that could revolutionize our approach by exploiting mosquitoes' natural mating behavior. Researchers at Oxitec have genetically modified mosquitoes to carry a trait that keeps their young from developing in the wild. These male mosquitoes seek out and mate with females, but their offspring die. After years of study, these genetically modified mosquitoes have been determined to be safe. Release of Oxitec males in Panama, the Cayman Islands, and Brazil test sites has reduced Aedes aegypti mosquito populations by 90%, the degree necessary to stop Zika. Brazil is now expanding the use of Oxitec mosquitoes to protect more of its citizens from mosquito-borne illness.

So why don't we have access to this technology in the United States yet? Since the mosquito has an extra gene, it is a genetically modified organism (GMO). Genetically modified plants have been particularly controversial. GMO herbicide or pesticide resistant crops have led to the overuse of these chemicals. Skepticism of new technology is warranted and all GMOs should be rigorously tested. However, a blanket ban on GMO would reject the long human history of modifying plants and animals for human benefit such as in agriculture and drug production. For example, diabetics are kept alive by GMO-produced insulin.

As an independent scientist, I have watched the development of this technology over the years. Like the FDA, I am confident the Oxitec mosquito is safe. This mosquito cannot transmit its modification to humans, other animals, or even other species of mosquitoes. Unlike pesticides, the genetic modification does not involve a toxin. I consider

this self-limiting application of GMO technology a prudent and effective way to reduce disease-carrying mosquitoes.

The stakes are high, but we have an opportunity to stop Zika from spreading. The time has come to end our reliance on insecticide spraying. I welcome the release of Oxitec mosquitoes in my Miami Beach neighborhood and strongly encourage our community to embrace the technology that has been making a difference in other countries.

Provided by Florida International University